

What is claimed is:

1        1. A data writing apparatus for writing data into storage  
2 means, comprising:

3        an upper-rank unit;

4        first storage means where data to be written has a  
5 redundancy structure; and

6        a control unit which writes data in said first storage  
7 means in response to a command from said upper-rank unit and  
8 includes

9        second storage means, and

10       logical disk writing/reading means for writing in said  
11 second storage means data writing of which at an address in said  
12 first storage means is instructed by said upper-rank unit and  
13 reporting completion of writing to said upper-rank unit, when  
14 a redundancy destruction occurs at said address.

1        2. The data writing apparatus according to claim 1,  
2 wherein said control unit further comprises logical disk  
3 monitoring means which verifies if said redundancy destruction  
4 at said address has been recovered, and

5        when said logical disk monitoring means verifies that said  
6 redundancy destruction at said address has been recovered, said  
7 logical disk writing/reading means reads data written in said  
8 second storage means and writes said data at said address in  
9 said first storage means.

1        3. The data writing apparatus according to claim 2,  
2 wherein said logical disk monitoring means comprises:  
3        management table updating means which checks a status of

4 said first storage means and updates a management table;  
5 a timer which informs said management table updating means  
6 of passage of a given time when elapsed; and  
7 write-enableness reporting means which reports recovery  
8 of said redundancy destruction at said address to said logical  
9 disk writing/reading means when said management table indicates  
10 said recovery of said redundancy destruction.

1 4. The data writing apparatus according to claim 1,  
2 wherein said second storage means is non-volatile storage means  
3 or volatile storage means having an independent power supply.

1 5. The data writing apparatus according to claim 1,  
2 wherein said second storage means retains data written by said  
3 control unit until said data is written in said first storage  
4 means.

1 6. A data writing/reading apparatus for writing data into  
2 storage means, comprising:

3 an upper-rank unit;

4 first storage means where data to be written has a  
5 redundancy structure; and

6 a control unit which writes data in said first storage  
7 means in response to a command from said upper-rank unit and  
8 includes

9 second storage means, and

10 logical disk writing/reading means for writing in said  
11 second storage means data writing of which at an address in said  
12 first storage means is instructed by said upper-rank unit and  
13 reporting completion of writing to said upper-rank unit, when

14 a redundancy destruction occurs at said address, and reading  
15 from said second storage means data for which a command to read  
16 from said address is given from said upper-rank unit when that  
17 data exists.

1       7. The data writing/reading apparatus according to claim  
2 6, wherein said control unit further comprises logical disk  
3 monitoring means which verifies if said redundancy destruction  
4 at said address has been recovered, and

5       when said logical disk monitoring means verifies that said  
6 redundancy destruction at said address has been recovered, said  
7 logical disk writing/reading means reads data written in said  
8 second storage means and writes said data at said address in  
9 said first storage means.

1       8. The data writing/reading apparatus according to claim  
2 7, wherein said logical disk monitoring means comprises:

3       management table updating means which checks a status of  
4 said first storage means and updates a management table;

5       a timer which informs said management table updating means  
6 of passage of a given time when elapsed; and

7       write-enableness reporting means which reports recovery  
8 of said redundancy destruction at said address to said logical  
9 disk writing/reading means when said management table indicates  
10 said recovery of said redundancy destruction.

1       9. The data writing/reading apparatus according to claim  
2 6, wherein said second storage means is non-volatile storage  
3 means or volatile storage means having an independent power  
4 supply.

1        10. The data writing/reading apparatus according to  
2 claim 6, wherein said second storage means retains data written  
3 by said control unit until said data is read by said control  
4 unit.

1        11. A data writing apparatus for writing data into storage  
2 means, comprising:

3        an upper-rank unit;

4        first storage means including data writing of which is  
5 instructed by an upper-rank unit and redundancy data and capable  
6 of, if data of a size equal to or smaller than a size of said  
7 redundancy data is destroyed, ensuring data writing from  
8 remaining data while repairing said data writing of which is  
9 instructed, in response to a command from said upper-rank unit;

10        a control unit which writes data in said first storage  
11 means in response to a command from said upper-rank unit and  
12 includes

13        second storage means, and

14        logical disk writing/reading means for writing in said  
15 second storage means data for which a command to write at an  
16 address in said first storage means is given from said upper-rank  
17 unit and reporting completion of writing to said upper-rank unit,  
18 when writing is not possible due to an error during data correction  
19 in an area including said address.

1        12. A method for writing data into storage means where  
2 data to be written has a redundancy structure, comprising the  
3 steps of:

4        A) when a redundancy destruction occurs at an address in

5 said first storage means where data to be written has a redundancy  
6 structure, writing in said second storage means data writing  
7 of which at said address is instructed by an upper-rank unit;  
8 and

9 B) reporting completion of writing to said upper-rank unit.

1 13. The method according to claim 12, further comprising  
2 the steps of:

3 C) verifying if said redundancy destruction at said address  
4 has been recovered;

5 D) when recovery of said redundancy destruction is verified,  
6 reading data written in said second storage means; and

7 E) writing said data at said address in said first storage  
8 means.

1 14. The method according to claim 12, further comprising  
2 the steps of:

3 F) checking a status of said first storage means when a  
4 given time elapses;

5 G) updating a management table;

6 H) reading data written in said second storage means when  
7 said management table indicates recovery of said redundancy  
8 destruction; and

9 I) writing said data at said address in said first storage  
10 means.

1 15. A method for writing and reading data into and from  
2 storage means where data to be written has a redundancy structure,  
3 comprising the steps of:

4 J) when a redundancy destruction occurs at an address in

5        said first storage means, writing in said second storage means  
6        data writing of which at said address is instructed by an  
7        upper-rank unit;

8            K) reporting completion of writing to said upper-rank unit;  
9        and

10          L) when there is data reading of which from said address  
11        is instructed by said upper-rank unit, reading said data from  
12        said second storage means.

1            16. The method according to claim 15, further comprising  
2        the steps of:

3            M) when recovery of said redundancy destruction is verified,  
4        reading data written in said second storage means and writing  
5        said data at said address in said first storage means.

1            17. The method according to claim 15, further comprising  
2        the steps of:

3            N) checking a status of said first storage means when a  
4        given time elapses;

5            O) updating a management table;

6            P) reading data written in said second storage means when  
7        said management table indicates recovery of said redundancy  
8        destruction; and

9            Q) writing said data at said address in said first storage  
10       means.

1            18. A computer program capable of running on a computer  
2        so that the computer performs said steps of claim 12.